

Economic Factors in Hospital Planning in Urban Areas

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THE ABSENCE of planning is not, per se, proof that chaos or anarchy prevails. Whether planning is called for depends on the good (commodity or service) in question and on the circumstances surrounding its production and consumption.

Forms of Economic Intervention

For a large variety of goods and services we tend in this country to accept the operating results of the market. This decision is rooted partly in faith in the beneficence of Adam Smith's discovery, the invisible hand (by which the individual in pursuing his own interests is also promoting the general interest). In addition, however, it partly reflects confidence in the superiority of decentralized decision making, something that the socialist countries have recently come to acknowledge. It is buttressed by the willingness of society to redistribute income through various devices when the results of the market offend its sense of fairness.

Society may intervene in economic affairs through additional devices (1). These devices are listed here, without elaboration, in order to convey their number and variety. Thus, it enacts

laws to safeguard persons and property. Anti-trust laws are meant to inhibit both the power of monopolies and their inefficiencies. Delivery systems that are costly to duplicate, such as the telephone or the electricity networks, are accorded public utility status, to which stated privileges and responsibilities attach. Regulation and licensure of certain categories of personnel are intended to safeguard the consumer. Subsidies (cash grants) and tax credits or deductions may be employed as inducements to encourage desired courses of action. Sometimes Government serves as the producer of services that it sells (the post office) or as the purchaser of services it pays for (hospital care). Planning is another vehicle of social control.

The dictionary defines planning as devising a scheme for doing, making, or arranging. A plan refers to any detailed method, formulated beforehand, for doing or making something. A statement of general principles does not constitute planning.

This paper focuses on areawide planning for hospital care because no other concrete body of planning experience from the health field is available to us in this country. Plans for mental health and mental retardation services are just coming off the drawing boards. Currently money is being allocated for drawing plans for the regional medical programs which derive from the De Bakey commission's report on heart disease, cancer, and stroke. It is known that these programs will encourage and facilitate cooperative arrangements among providers

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of service in a region. The contents of these programs will evolve in response to local initiative and will vary among regions, depending on needs and opportunities and on whether primary emphasis is given to the wider delivery of services created by medical discoveries or to improving the overall quality of medical care.

Legislation authorizing comprehensive planning of health services by health departments has just been enacted.

My analysis of planning for hospital care will be limited to economic factors. Such an analysis is incomplete, of course, lacking the political, social, and physical elements that also enter into planning.

I strongly believe, however, that the analysis of a concrete body of experience, though incomplete, is more valuable than any amount of discussion of generalities. The successes, opportunities, and failures of planning can only be appraised in the light of experience.

Public Concern About Hospitals

Why is there public concern for the proper development of hospital services? The reason is that from the very beginning hospitals have absorbed large masses of social capital. In this context, social capital includes both philanthropic and governmental.

It is perhaps an accident of history that the public has furnished the physician's workshop without expense to him—something it has not done for other professions in private practice. Certain factors, however, suggest that this policy may have some rational bases. Seventy to eighty years ago capital requirements for hospitals loomed large relative to operating expenditures, and investment in one represented a big chunk of capital. Free care, or care at less than cost, for the poor (who represented a majority of hospital patients) was the accepted mode. The education and training of new physicians was, in turn, closely associated with care of the sick poor in the hospital.

The existence of public concern, however, is not a sufficient condition for action. Another necessary ingredient is the possibility of doing something about the problem. A community or neighborhood can, with its own resources, build a local hospital or enlarge an existing one, or re-

frain from doing either. By contrast, a community's ability to influence its supply of physicians appears to be small.

From the outset, planning for hospital care has been carried on separately from other social planning. City planning agencies have been either unwilling or unable to assume responsibility for hospital planning. One can only speculate on the reasons for their reluctance. Two factors appear to have been especially important. One is the complexity of hospital services. Given the difficulties of measuring the quality of the output, the tendency is to resort to professional—medical—judgment. The second is the mixed nature of the hospital economy—governmental, voluntary (nonprofit), and proprietary (for profit). City planners are accustomed to plan for facilities under a single, governmental form of control.

Economic Factors in Planning

Among the economic factors that support community planning for hospital care are the following: (*a*) the waste of a low rate of occupancy; (*b*) adapting to random variation in admissions; (*c*) the trend toward larger hospitals; (*d*) the indivisibility of equipment and teams; (*e*) the Hill-Burton program, rising unit costs, and Roemer's law; (*f*) the long life of the physical plant; (*g*) changes in the population of cities and the growth of suburbs; and (*h*) Federal grants-in-aid.

Low rate of occupancy. The high proportion of overhead to total hospital cost was recognized by accountants such as Charles Roswell and by administrators long before it was measured by economists (2). A low rate of occupancy reduces income much more than expenditures and can pose a threat to the financial stability of the hospital.

During the depression of the thirties, Government hospitals were overcrowded while voluntary hospitals had vacant beds. (Haven Emerson's "Hospital Survey for New York" documents this point exhaustively.) This situation seemed particularly irrational, being contrary to the interests of all concerned. The obvious remedy was to provide all patients equal access to all hospitals, regardless of who paid the hospital bill. This policy also appealed on another ground: a hospital open to all classes

of patients has a superior ability to serve its community. (The latter point is still valid, of course, and has gained in relevance with the enactment of Medicare.)

With high overhead costs, a low rate of occupancy leads to a financial deficit. Therefore, it is a sufficient deterrent to overbuilding to inform every hospital of events, plans, and probable developments elsewhere which are likely to result in overbuilding in the aggregate. The planning agency is in a better position to ascertain such information and to disseminate it than any individual hospital.

Random variation in admissions. One of the chief contributions of operations research to the health field is its exploration of the application of stochastic (random) processes to hospitals (3, 4). A formal, systematic explanation of the persistence of average rates of occupancy below 100 percent is only one consequence.

In addition, various devices to stabilize hospital patient load—and to raise average occupancy—have been examined or suggested (5, 6), such as postponement and improved scheduling of elective admissions, replacement of large wards with small bedrooms, designation of swing beds between intensive and intermediate care units in a progressive care facility, occasional attempts to end the physical separation of maternity patients, and recommendations to transfer excess patients to other hospitals. Although such transfers are customary from private to governmental hospitals, they rarely take place in the opposite direction.

All these devices except for interhospital transfers can be introduced within an individual hospital at the wish of its management and professional staff. The transfer of patients among hospitals, however, encounters the troublesome problem of staff appointments for physicians (dealt with later).

Trend toward larger hospitals. In the large city, interest has focused much more on the deficiencies of small hospitals than on the possible inefficiencies of large ones. A rule of thumb I have learned from several administrators is that the best size of hospital is the current size of his hospital plus 100 or 200 beds, depending on the administrator's assessment of prospects for financing an expansion.

On theoretical grounds alone, one can argue

in favor of a U-shaped long-term cost curve for hospitals. On the one hand, specialization and division of labor result in declining unit cost as the scale of output increases. Beyond a certain point, however, complexities of management intrude and coordination of efforts becomes more difficult, so that unit cost rises. Application of the theoretical model to real data is complicated, unfortunately, by differences among hospitals in range, complexity, and quality of services and by differences in salary levels and educational programs. Various attempts have been made to deal with these problems in order to determine the relationship between output and cost (7, 8), and progress is being made. It is only fair to say that a final, definitive answer is not yet at hand.

Economic analysis apart, small hospitals are unable to meet two other criteria for a satisfactory modern hospital. They cannot concentrate enough patients for teaching, and they cannot be truly general in the patients they serve and the services they render. These considerations, rather than economy, may have been decisive in fostering the movement in cities against small hospitals of say 100 beds or so.

While the average size of hospitals has increased, no hospital, however small, has been debarred from caring for any category of patients. Moreover, a small hospital has frequently ceased to be one by expanding. Hospitals of larger size permit a concentration of patients for the convenience of physicians. In sum, this policy poses no disadvantage to providers of service, except possibly to hospitals that are unable to expand.

Two sets of objections can be advanced against the trend toward larger hospitals. Patients and prospective visitors may prefer shorter travel time to one of the more numerous smaller hospitals over longer travel to fewer and larger hospitals. In the production of goods, the lowest cost for a specified quality is an unexceptionable objective. In the production of a service, the consumer must travel to the place where it is produced (or less often, the provider of services visits the customer). The cost of production is only part of the real cost involved, travel time and inconvenience being others (9).

The second objection is that the optimum size

of hospital for inpatient services may differ from that for outpatient services. When the patient has a family physician, there is less need for all medical services to be integrated at a single facility than when the patient depends on that facility exclusively. The original basis for promoting integration of medical care services was to assure continuity of care and to avoid fragmentation and the poor quality of care associated with it. More recently, integration of services is also intended to help certain people who are regarded as incapable of making good choices in buying health services.

Indivisibility of equipment and teams. The hospital today has much more expensive equipment than formerly and employs large specialized teams to perform certain diagnostic and therapeutic procedures. Good, almost ubiquitous, examples of facilities that come in fairly large units are cobalt bombs for radiation therapy, teams for open heart surgery, and—just emerging—renal dialysis units for chronically ill patients. The costs of larger pieces of equipment are given in an earlier article of mine (10); the cost of chronic renal dialysis is estimated at \$15,000 a year.

To serve but a few patients a facility must be established that could serve 10, 20, or even 100 patients at relatively little additional cost. When many such facilities are set up in a community, the average workload for each is small (11) and the unit cost high. Moreover, the skills of the personnel may deteriorate through disuse.

An obvious remedy is to restrict the number of facilities in an area. Some planners expect that knowledge of the facts would lead hospitals to cooperate in meeting the community's needs. Failure to cooperate is regarded as a failure to understand or as the unfortunate by-product of institutional vanity.

This view of the situation may be too simple, in my opinion, for at least two reasons. When a hospital establishes a specialized service facility, the physician associated with it who is professionally qualified to use the facility benefits. A decision not to establish the facility in the physician's hospital deprives him of income and of the continuing learning experience on which his specialized skills depend. Moreover, if hospital A establishes such a facility, not only does

it and its staff gain while hospital B and its staff lose, but the community may incur an additional loss through the deterioration of the skills of hospital B's staff and the obsolescence of their knowledge. These losses can be averted, however, by a policy of selective duplication of hospital staff appointments for physicians. (Under this policy, not all physicians but only physicians who require access to the special facilities—which are to be located in a small number of hospitals—would have appointments to staffs of hospitals other than their own.)

The presence of a facility or program has spillover effects for the other parts of an institution. Renal dialysis is intimately connected with advances in kidney transplantation, for example. Radiation therapy is only one of the modalities applied in treating cancer.

Let us consider a more common facility, the obstetrical service. In many hospitals its rate of occupancy is low. Yet the presence of such a facility affects the strength of the pediatrics department, the gynecology service, and intern and nurse training. A service that is too costly in terms of unit cost may make sense in terms of the overall mission of a hospital, once it is determined that this hospital should continue in operation. A decision by a hospital to round out its services tends to be both self-confirmatory and cumulatively reinforcing.

For the first time in this analysis one encounters possible conflicts of interest between the individual hospital and the larger community, the individual hospital being concerned with overall institutional strength and the community seeking to minimize the total cost of a particular service. The hospital may exaggerate the adverse spillover effects of failure to establish a certain facility. In addition, the hospital tends to assume little responsibility for the quality of medical care in the community outside its walls. Decisions on its staff appointments of physicians are made without regard for services supplied to ambulatory patients.

In its present dimensions, the problem of hospital appointments for the visiting staff has emerged only within the past generation. The presence of a resident staff, and more recently of a full-time clinical staff, reduces the value to the hospital of the voluntary attending staff.

At the same time the staff appointment no longer serves as the vehicle for training toward specialty practice, so that the practicing physician is not so willing as formerly to give the hospital his time and energies (12).

The regional medical programs for heart disease, cancer, and stroke may substantially affect this situation. On the one hand, in the hospital selected to house a unique facility, the need for an equitable distribution of staff privileges to physicians on other hospital staffs who need to use the facility will be made explicit. If public funds are employed, such a distribution of staff privileges may become imperative. On the other hand, there may ensue an increasing concentration of specialists in hospitals who will spend full time on clinical services, rather than in research.

Hill-Burton, unit cost, and Roemer's law. Three sets of events have led to increased recognition of the advantages offered by coordinated community action.

The Hill-Burton program for assisting in the construction of nonprofit (voluntary or governmental—mostly the former) hospitals seems to have accomplished its mission of bringing hospital services to the rural population. The major problems are now in the cities, where modernization, improvement, and coordination are seen as the imperative goals, rather than expansion.

The unit cost of hospital care continues to rise at a high rate. The explanation that hospitals are catching up with other industries in wages and working conditions fails to explain remaining inequities, which require correction from time to time. Medical progress accounts for only part of the cost increase. Many economists believe that the most important factor is the continuing lag of the hospital industry in achieving gains in productivity comparable to those achieved in the economy at large (13, 14)—Somers, however, dissents (15). If this explanation is correct, then, in the absence of substantial opportunities for automating many functions of the hospital, the high rate of increase in the hospital's unit cost is likely to continue. Indeed, the more progressive the economy as a whole, as measured by increases in productivity, the greater the increase in hospital unit cost. Another emerging factor is the increasing tendency to reimburse hospitals at actual cur-

rent cost. Incentives to operate efficiently are lacking.

To keep expenditures for hospital care under control, it would be necessary to curtail the use of hospitals.

Perhaps the major impetus for hospital planning recently has come from still another source, namely, recognition that hospital use may not be a good thing, per se, that relatively low use need not reflect deprivation (16, 17), and indeed that the basis for determining the proper level of use is constantly shifting, with the available supply of beds possibly exerting a strong influence on demand (18, 19). One can no longer assume that need, as medically determined, and financial ability to pay combine to create a uniquely determined, appropriate criterion for planning hospital use. Controversy still surrounds the so-called Roemer's law—that under financing through prepayment newly built hospital beds do not go empty (20-22). Acceptance of the law, however, directly points to the desirability of limiting the total number of beds in an area. If under third-party financing and variable standards of hospital use, the threat of vacant beds in the individual hospital has lost its potency, recourse to direct control or veto of hospital building plans by an outside agency may be necessary.

The obvious desirability of avoiding recurring, periodic requests for increases in the premiums of Blue Cross hospitalization plans points in the same direction. State commissioners of insurance who review these applications recognize the advantages of financing the operations of a smaller supply of beds.

Again, a potential conflict of interests arises between the individual hospital and the community. It may make sense to exhort the public not to abuse health insurance benefits and not to ask for expensive amenities in the hospital; but it is pointless, if Roemer's law is valid, to exhort hospitals not to build. A firm No is required, as in New York State, where areawide planning is now compulsory instead of voluntary.

Life of physical plant. In depreciation tables, hospitals are shown with a life of at least 40 years. Hospital facilities, therefore, must be planned for a long time ahead. Since nobody owns a clear crystal ball and the years between the decennial censuses do not provide firm base

lines, planning agencies usually compromise and project bed requirements 10 to 15 years ahead.

Planning for hospital care always entails planning for small geographic areas. Population projection is difficult from a technical standpoint and always subject to outside forces that are neither well understood nor readily controlled. Allowing a margin for error is a safe precaution. The demographic and socioeconomic composition of the population is even more uncertain than its total number, and the implications for hospital use of differences or changes in a population's composition are by no means clear (23). The effects of future technological change are certainly not known, other than the steadily increasing ratio of square feet per hospital bed. It is no exaggeration to say that a large proportion of a given total of forecasts of required hospital use are bound to be in error.

I infer that sound judgment as to direction will probably be more helpful than precise arithmetic calculations. The most reliable device for minimizing the consequences of error is not more careful long-range forecasting but provision for as flexible use of facilities as possible (24, 25). It should be recognized that a plant built today will not be ideally suited for the conditions foreseen for a decade hence; nor will the plant be precisely adapted to today's conditions or volume of output. The extra cost of flexibility represents a built-in diseconomy of operation (26).

A major task of planning agencies, I conclude, is to search for, develop, and test devices that will promote the flexible adaptation and use of hospital facilities over time.

Population changes and shifts. Certain changes in society at large affect planning for hospital care. The close tie between medical education and the provision of free hospital care has kept the ratio of beds to population in the central cities higher than it would otherwise be. The institutions supplying hospital care have also supplied care to indigent ambulatory patients on an organized basis.

With the advent of Medicare, and if liberal Medicaid plans are adopted by the States, patients who receive free care will furnish a steadily declining fraction of all teaching material. If private patients are used for teaching, then

a hospital with a large teaching program will be freer than formerly to move from one site to another. The advantage in quality of care that accrued to an inner-city location will diminish. One alternative to removal will be an intensified concern on the part of the hospital for renewal of the area in which it is located. Acting alone to carry out renewal, a hospital can accomplish little. Acting in concert with other agencies and groups, it may contribute to the conservation of its community.

An independent hospital is likely to feel freer to move than one that is a member of a religious or ethnic network. In the case of the hospital that is a member of a network more of the factors that reflect the community's diverse needs can be brought to bear on its decisions, while to the independent hospital some of these factors appear to be beyond its ability to control.

One of the important contributions of a planning agency is to make relevant to the decisions of an individual institution certain factors that normally do not concern it. By enlarging the area of planning, benefits or costs accruing elsewhere are converted into factors that may be taken into account explicitly.

Federal grants-in-aid. Rufus Rorem has said, "Cash is the prince of coordinators." At the time he was referring to the leverage that could be exercised through construction grants. Federal matching grants to areawide planning agencies were still in the future.

Matching grants have proved to be very influential. Of 63 hospital planning councils now in existence, 55 have been organized since 1962, when Federal monies for this purpose began to flow. Before 1962 the hospital planning movement was making slow headway. One agency was founded in the 1930's, two in the 1940's, two in the 1950's, and three in the early 1960's. In 1962, 13 councils were organized, followed by 13, 5, 11, and 13 in each of the next 4 years. (These data are from the Division of Hospitals and Medical Facilities, Public Health Service.)

It is evident that few communities were willing to spend their own money on hospital planning activities. In one city, for example, when outside funds were withdrawn, operations were curtailed substantially.

The history of areawide planning agencies

once more demonstrates the magic discovered by the Rockefeller Foundation, namely, the multiplicative power of the outside dollar that is to be matched locally. It is not possible to gauge what would happen if Federal funds were withdrawn or what will happen when grants are no longer earmarked for hospital planning. It seems prudent to begin thinking, however, about evaluating the programs for planning and justifying them.

How to evaluate? We cannot conduct controlled experiments comparing what is with what would otherwise have been. One possible device is to set targets and to measure how closely they are approached.

How is one to justify? This effort is best undertaken in the light of available and probable alternatives. Why is the course recommended by the planning agency believed to be the superior one? Its recommendations usually reflect a balancing of competing objectives. What are they, and what scale of importance is attached to each? The spelling out of objectives and of their respective weights, along with a presentation and evaluation of alternative ways to achieve the objectives, will enable the public to judge the desirability of recommendations.

Implications

In relation to total expenditures for hospital care, the costs of maintaining a hospital planning agency are modest. Both the modal and median annual budgets for such an agency today are less than \$80,000 (according to Division of Hospitals and Medical Facilities, Public Health Service). The potential benefits—positive or negative—are large. If a planning agency is effective, it reduces the risk of a multitude of small or moderate mistakes but it raises the risk of a few large ones.

We must try to develop planning agencies for health care that will make sensible analyses of the important facets of a problem and advance recommendations which are geared to flexibility. Such an agency must play several parts simultaneously. It needs to know almost everything concerning the community and its health services; it should also be aware of what it does not know about them. Such an agency should keep abreast of the significant issues of health policy, study some of these in depth, and make

recommendations on those for which a solution is known or for which a solution is imperative—whatever the current state of knowledge. A knowledgeable and sensitive planning agency will be able to anticipate some of the problems that will emerge in the next few years, before they become acutely pressing. An effective agency will divorce itself from current fads and escape the awesome authority of arithmetic, relying instead on the skillful analyses of its staff and the mature judgments of its board.

Summary

Economic intervention by Government can take many forms. Planning is one of them. In recent years the Federal Government has supported the large-scale expansion of area-wide hospital planning agencies in this country.

The original basis for area-wide hospital planning in the 1930's was recognition that overhead cost constitutes a high proportion of total hospital cost. It follows that a low rate of bed occupancy reduces income much more than expenditures do and that large numbers of vacant beds threaten the financial stability of hospitals.

Avoidance of duplication among hospitals of expensive facilities and services requires recognition of the importance of selective duplication of staff appointments for physicians. (Through selective duplication of appointments, facilities located in only a small number of hospitals can be made available to physicians on staffs of other hospitals who need to use them.)

In a number of instances, possible conflicts of interest are noted between the individual hospital and the community. Under these circumstances, voluntary cooperation may not be forthcoming. Perhaps the outstanding example of such conflict is the possibility that additional hospital beds will tend to be used whenever third-party financing of hospital care is predominant.

If the increase in hospital unit cost is largely attributable to productivity gains in the hospital lagging behind the rest of the economy, primary reliance in controlling hospital care expenditures must be placed on the control of hospital use. A firm No to hospital building plans may be required.

The prospects for accurate forecasting of hospital use in a given local area are not bright. Planning should therefore concentrate on developing devices that will permit flexible use of facilities.

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